Iwona Duma, sworn translator of the English language for the District Court in Warsaw, 2/88 Lachmana Street, 02-786 Warsaw, tel./fax: (22) 855 50 57; mobile: 0 – 608 799 839

Translation from the Polish language

Cable television network access-management system
and method for management of receivers operating within cable television network

The object of the invention is a system for management of access to a cable television network and a method for management of receivers operating a cable television network.

The present application is an extension to the application entitled "Cable television network access-management system and method for management of receivers operating within cable television network" filed on 6 March 2002 in the Patent Office of the Republic of Poland and has been assigned a number P 352643. A system for managing the access to the cable television network described therein consists of at least one master decoding device, equipped with an electronic card to which there are linked at least one slave decoding device and a transmitting device which generates and transmits encoded messages allowing for using the master and slave decoding devices and receivers connected to them. The master decoding device of the described system and at least one slave decoding device linked to it are located in a defined distance from each other and operate in the case when the distance between them does not exceed a defined nominal distance, defined by a configuration, a number and a quality of splitters and connections.

Another system for management of access to a cable television network is known from the US Patent No. 5,748,732 which describes a method for management of access to the network and a device for controlling access to the network through a master decoder and a slave decoder. The master

decoder receives information from a central management device for controlling the operation of the slave decoder, which it sends to the slave decoder after an electronic card of the slave decoder is placed in a reader of the master decoder and information is read from the electronic card of the slave decoder.

The object of the invention is the fact that in a cable television network access-management system comprising at least one master decoding device provided with an electronic card, and at least one slave decoding device linked to it, which is located in a defined distance dependent upon a configuration, a number and a quality of splitters and connections and a transmitting device which generates and transmits messages allowing for the usage of the master and slave decoding devices and receivers linked to them, the master decoding device and at least one slave decoding device linked together comprise blocks for analysis of messages transmitted between the master decoding devices, the slave decoding devices and external devices and blocks for communication with external devices.

Preferably messages exchanged between the master decoding devices and the slave decoding devices are messages used to identify a given decoding device, systems that are their component parts, or external devices linked to them.

Preferably the identifying messages include a type of device, their version and/or their serial number.

Preferably messages exchanged between the master decoding devices and the slave decoding devices are messages used to identify software.

Preferably the messages used to identify software include a version number and/or a serial number of the software.

Preferably messages exchanged between the master decoding devices and the slave decoding devices are messages facilitating interaction between the decoding devices, systems integral to them, or between software installed in the decoding devices or devices co-operating with them.

Preferably messages exchanged between the master decoding devices and the slave decoding devices are messages which incorporate an operating status of a given device/program, a result of performing a certain operation, an

order to execute a certain operation and data collected or processed by a certain device/software.

Preferably messages exchanged between the master decoding devices and the slave decoding devices are messages generated within the decoding devices or delivered from external sources.

Preferably messages exchanged between the master decoding devices and the slave decoding devices can be internet data, text messages, streams and files containing sound, pictures, video and software, and/or updates of software.

Preferably messages exchanged between the master decoding devices and the slave decoding devices are additional messages generated by software installed in the decoding devices or devices which are co-operating with them, or messages which are delivered to the decoding devices from outside sources.

Preferably messages exchanged between the master decoding devices, the slave decoding devices, and outside devices consist of synchronising bytes, a heading with a source and a destination addresses, a type of message, a flag with information as to whether the message contains data and the size of the block of data, and also data constituting the message content, and a checksum.

The object of this invention is shown in implementation examples in the enclosed drawings, in which fig. 1 illustrates a system comprising decoders where a method of sending messages between decoders is presented, fig. 2 illustrates a system comprising decoders where a method of sending messages between a decoder and an external device is presented, fig. 3 illustrates a structure of a message sent between decoders, fig. 4 illustrates a flow diagram of message preparation procedure, fig. 5 illustrates a flow diagram of the procedure of receiving message.

The system for managing access to the cable television network presented in fig. 1 comprises the master decoder 11 and *n* slave decoders 12, 15 linked with each other. The master decoder 11 and the slave decoders 12, 15 have four functional blocks, crucial for the system under discussion.

Receiving and processing systems 251, 261, 271 are responsible for receiving a signal from the public cable network 8. This signal is converted to digital form and is then sent for further processing. Processor 250, 260, 270 is responsible for the control of all the other systems 253, 263, 273 operating within one decoder. For example, in fig.1, in the other systems 253, 263, 273, the systems 255, 265, 275 of access control were separated, and the other systems 254, 264, 274, which can be audio and video decoders, including those of MPEG and AC/3 format, systems generating graphics, systems generating audio and video output signals for a TV receiver, systems of memory (RAM, ROM, Flash, HDD), systems controlling external interfaces (keyboard, remote control unit), systems controlling a return channel. The processor 250, 260, 270 executes software controlling the work of these systems. It and also controls a demultiplexer 252, 262, 272 operating the private network 13 used to send various messages. The private network 13 can share physical medium with the public cable network 8 and in this case the demultiplexer 252, 262, 272 becomes an integral part of the receiving and processing system operating the cable television network 8.

Fig. 1 also illustrates an example of a way of message transmission between two systems of access control 255 and 265 of two different decoders 11 and 12. In the situation illustrated in fig. 1, the access control system 255 of the master decoder 11 transmits a message to the access control system 265 of the first slave decoder 12. This message, generated by the application of the access control system 255, and then transmitted by the application of the demultiplexer 252, is transported over the private network 13. The transmitted message is received by the demultiplexers 262, 272 of the remaining decoders 12, 15. The first slave decoder 12, which received the message through the route 281, accepts this message, while the n-th slave decoder 15, which received this message through the route 282, rejects it. Next, the application of the access control system 265 of the first slave decoder 12 begins to process the message received from the access control system 255 of the master decoder 11.

Fig. 2 presents an example of a way of message transmission between

a device B 277 of the n-th slave decoder 15 and an external device A 267 linked to the first slave decoder 12 using an interface A 266 (for example a serial port, an external IP network, a wireless connection i.e. Bluetooth or infra-red link, or a specific connection assigned to a given type of a device i.e. a Smart-Card connection). The device A 267 linked to the first decoder 12 sends a message to the device B 277 which receives the message through the route 286. This message is sent also using the route 285, is simultaneously rejected by the master decoder 11 because it is not dedicated to that decoder.

An exemplary format of a message sent between two decoders is presented in fig. 3. Only the fields of which the message is composed have been shown, without specifying their sizes. The precise format of a particular field can be adapted to suit a specific solution.

An exemplary message, beginning from the top, consists of synchronising bytes 300 which are used for identification of a new message. They should be unique bytes which will not appear in a later part of the message. For example, if the message is encoded in the Manchester system, the two bytes of values 0h8E and 0h71 respectively can serve as the synchronising bytes. This combination will not appear in the message encrypted using Manchester system and can be used as a unique characterisation of the beginning of the message.

The next part of the message is a heading 301 which consists of a field describing a destination address 302 of the message, a field describing a source address 303 of the message, a flag 304 with information whether the message contains data or not, a field 305 describing the type of the message, and a field 306 describing the length of a payload 307.

The last field is a checksum 308 which is used to detect and/or correct an error that can appear during the message transmission.

The described message can be addressed to a particular decoder or to all decoders. Information within the message can be placed in the block of data or in the block describing the type of message (messages without payload are the any control and confirmation messages)

The process of preparation of the message described above is

presented in fig. 4 in the form of a block diagram.

The message formation starts in step 311 where the message is generated by a program, which is going to send the message. In step 312 the program creates the message, i.e. forms the heading with source and destination addresses, type and length of attached data. Next it adds data, and finally calculates the code of the checksum for the whole message. The procedure of message transmission starts in step 313.

The messages, which were sent, are delivered to the demultiplexer, which analyses the state of the private network 13 waiting to receive transmitted messages.

The procedure of message reception and analysis presented in fig. 5 starts in step 401 where the demultiplexer receives an incoming message. In step 402 the demultiplexer checks if the form of the delivered message is correct. The transmission errors can be a result of a collision between two simultaneously sent messages. For this reason the format of message is verified and it is checked if data, at least in the heading, are not corrupt. The verification process is based on the analysis of the checksum. If in step 403 it emerges that the message is damaged, the message is rejected in step 404. If the message is in a correct form, in step 405 the heading is analysed, by reading the data concerning the destination address. It is decided in step 406 whether the message is dedicated to this particular decoder. In case the message is not dedicated to this decoder, the rejection follows in step 407. If the message is dedicated to the given decoder it is read in step 408. Next, it is verified in step 409 if the given type of the message can be used by the decoder. If the message has been sent to all decoders, but one of them does not have a device to support the processing of this message, in step 410 the message is rejected. However, if the given type of message can be processed by the decoder, in step 411 the message is passed to the resources for which it is directed, for example to software responsible for certain functions or operation of a particular device.

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POWER OF ATTORNEY
/-/ illegible signature
dr. eng. LUDWIK HUDY
Patent Attorney
Reg. No. 3098

/oblong stamp with the following contents:/
PATELHA
PATENT OFFICE
dr. eng. LUDWIK HUDY
Patent Attorney
32-070 Czernichów, Czernichów 4
Statistical Identification Number REGON: 350765668;
Tax Identification Number NIP: 677-100-93-67

CLAIMS

1. A cable television network access-management system comprising at least one master decoding device provided with an electronic card, and at least one slave decoding device linked to it, which is located in a defined distance dependent upon a configuration, a number and a quality of splitters and connections and a transmitting device which generates and transmits messages allowing for the usage of the master and slave decoding devices and receivers linked to them, according to the application P 352643, characterized in that the master decoding device (11) and at least one slave decoding device linked together (12, 15) comprise blocks for analysis of messages transmitted between the master decoding devices (11), the slave decoding devices (12, 15) and external devices (267) and blocks (266) for communication with external devices (267).

2. The cable television network access-management system according to claim 1, characterized in that messages exchanged between the master decoding devices (11) and the slave decoding devices (12, 15) are messages

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used to identify a given decoding device (11, 12, 15), systems that are their component parts, or external devices (267) linked to them.

3. The cable television network access-management system according to claim 2, characterized in that the identifying messages include a type of device, their version and/or their serial number.

4. The cable television network access-management system according to claim 1, characterized in that the messages exchanged between the master decoding devices (11) and the slave decoding devices (12, 15) are messages used to identify software.

5. The cable television network access-management system according to claim 4, characterized in that the messages used to identify software include a version number and/or a serial number of the software.

6. The cable television network access-management system according to claim 1, characterized in that the messages exchanged between the master decoding devices (11) and the slave decoding devices (12, 15) are messages facilitating interaction between the decoding devices (11, 12, 15), systems integral to them, or between software installed in the decoding devices (11, 12, 15) or devices co-operating with them.

7. The cable television network access-management system according to claim 1, characterized in that the messages exchanged between the master decoding devices (11) and the slave decoding devices (12, 15) are messages which incorporate an operating status of a given device/program, a result of performing a certain operation, an order to execute a certain operation and data collected or processed by a certain device/software.

8. The cable television network access-management system according to claim 1, characterized in that the messages exchanged between the master

decoding devices (11) and the slave decoding devices (12, 15) are messages generated within the decoding devices (11, 12, 15) or delivered from external sources.

9. The cable television network access-management system according to claim 1, characterized in that the messages exchanged between the master decoding devices (11) and the slave decoding devices (12, 15) can be internet data, text messages, streams and files containing sound, pictures, video and software, and/or updates of software.

10. The cable television network access-management system according to claim 1, characterized in that the messages exchanged between the master decoding devices (11) and the slave decoding devices (12, 15) are additional messages generated by software installed in the decoding devices (11, 12, 15) or devices which are co-operating with them, or messages which are delivered to the decoding devices (11, 12, 15) from outside sources.

11. The cable television network access-management system according to claim 1, characterized in that the messages exchanged between the master decoding devices, the slave decoding devices, and outside devices consist of synchronising bytes (300), a heading (301) with a source (302) and a destination (303) addresses, a type (305) of message, a flag (304) with information as to whether the message contains data and the size (306) of the block of data, and also data constituting the message content (307) , and a checksum (308).

ABSTRACT

In a cable television network access-management system comprising at least one master decoding device (11) provided with an electronic card, and at least one slave decoding device (12) linked to it, which is located in a defined distance dependent upon a configuration, a number and a quality of splitters and connections and a transmitting device which generates and transmits

messages allowing for the usage of the master (11) and slave (12, 15) decoding devices and external devices (267), the master decoding device (11) and at least one slave decoding device linked together (12, 15) comprise blocks for analysis of messages transmitted between the master decoding devices (11), the slave decoding devices (12, 15) and external devices (267) and blocks (266) for communication with external devices (267).

11 claims

Fig. 2

Applicant: Advanced Digital Broadcast Ltd.
8/F, 145 Chung Shan North Road, Section 2
Taipei, 104 Taiwan, Taiwan

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POWER OF ATTORNEY
/-/ illegible signature
dr. eng. LUDWIK HUDY
Patent Attorney
Reg. No. 3098

/oblong stamp with the following contents:/
PATELHA
PATENT OFFICE
dr. eng. LUDWIK HUDY
Patent Attorney
32-070 Czernichów, Czernichów 4
Statistical Identification Number REGON: 350765668;
Tax Identification Number NIP: 677-100-93-67

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POWER OF ATTORNEY
/-/ illegible signature
dr. eng. LUDWIK HUDY
Patent Attorney
Reg. No. 3098

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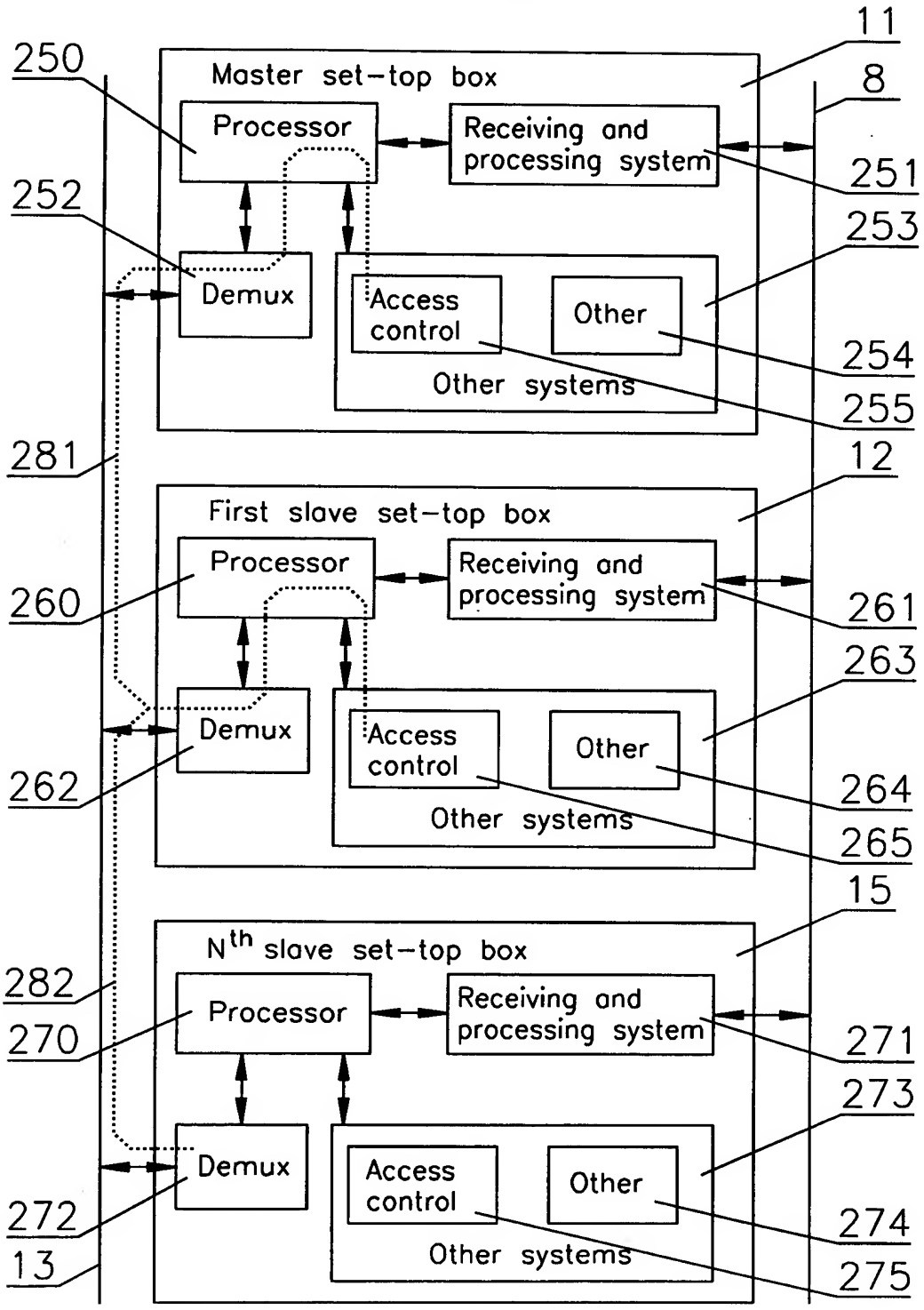
11
250
Master set-top box
8
Processor
Receiving and processing system
251
252
253
Demux
Access control
Other
254
Other systems
255
281
12
First slave set-top box
Processor
Receiving and processing system
260
261
263
Demux
Access control
Other
262
264
Other systems
265
15
N^th slave set-top box
282
Processor
Receiving and processing system
270
271
273
Demux
Access control
Other
272
274
13
Other systems
275

Fig. 1

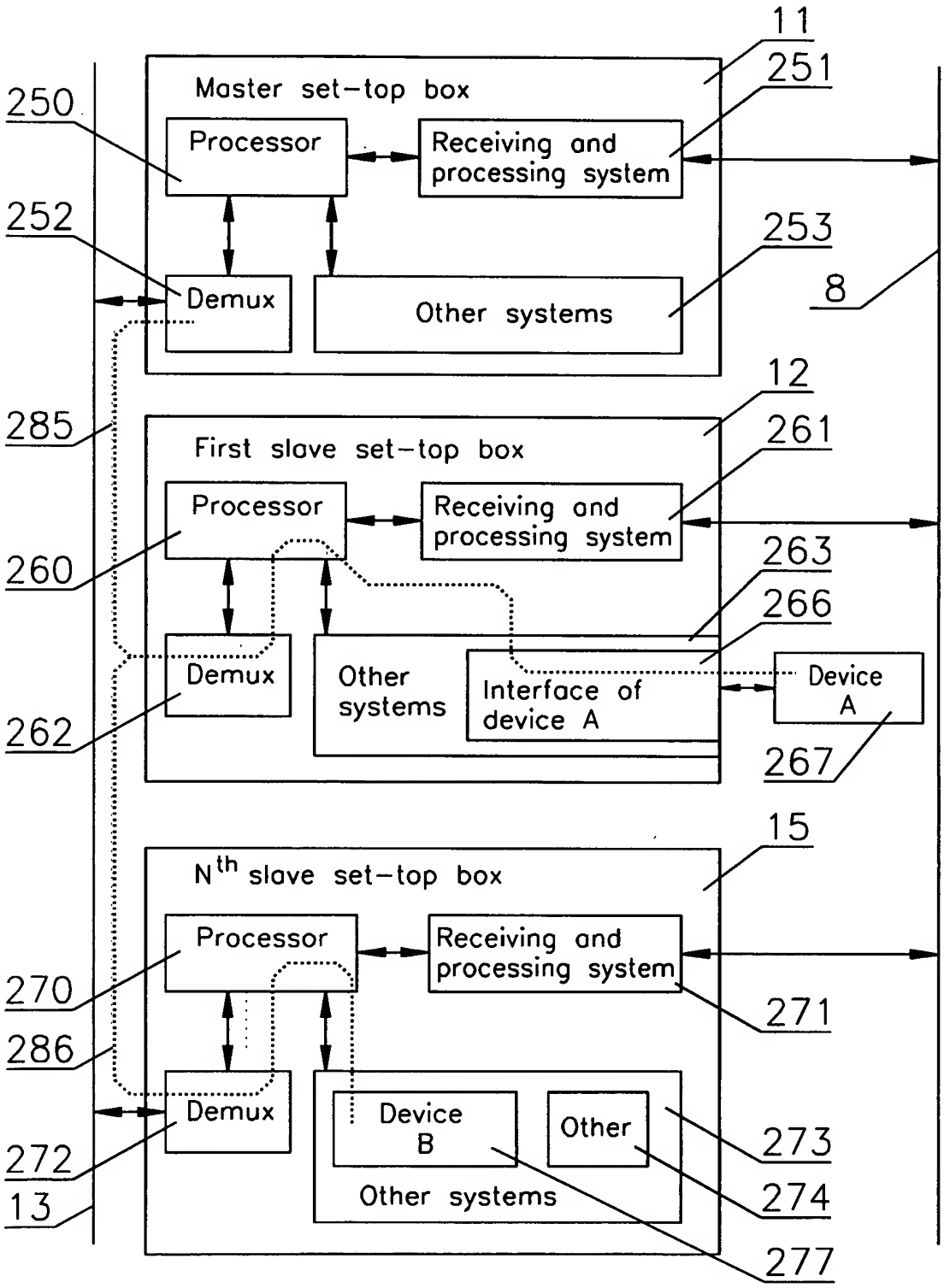
11
251
250
Master set-top box
Processor
Receiving and processing system
252
253
Demux
Other systems
8
12
285
First slave set-top box
261
Processor
Receiving and processing system
260
263
266
Demux
Other systems
Interface of device A
Device A
262
267
15
Nth slave set-top box
Processor
Receiving and processing system
270
271
286
Demux
Device B
Other
273
272
274
Other systems
13
277

Fig. 2

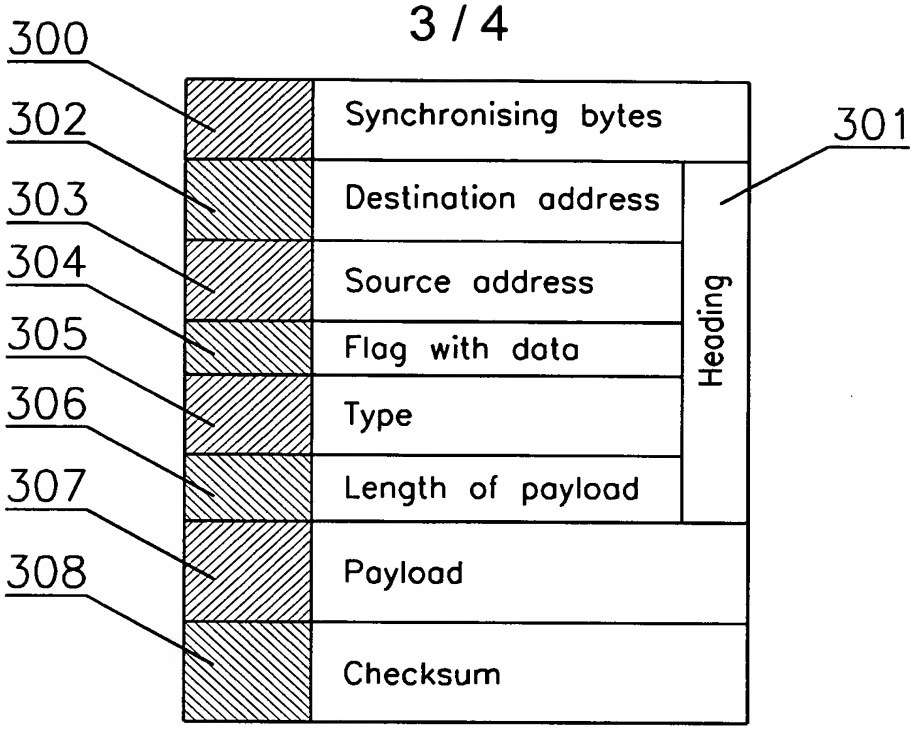
300
302
303
304
305
306
307
308
Synchronising bytes
Destination address
Source address
Flag with data
Type
Length of payload
Payload
Checksum
Heading
301

Fig. 3

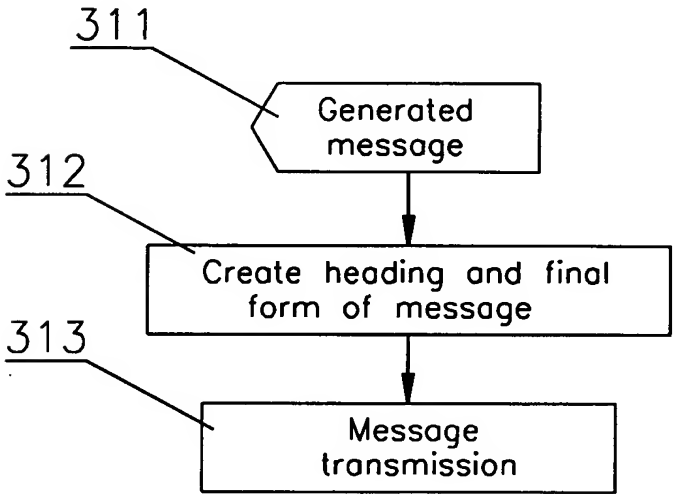
311
Generated message
312
Create heading and final form of message
313
Message transmission

Fig. 4


WARSZAWIE 1
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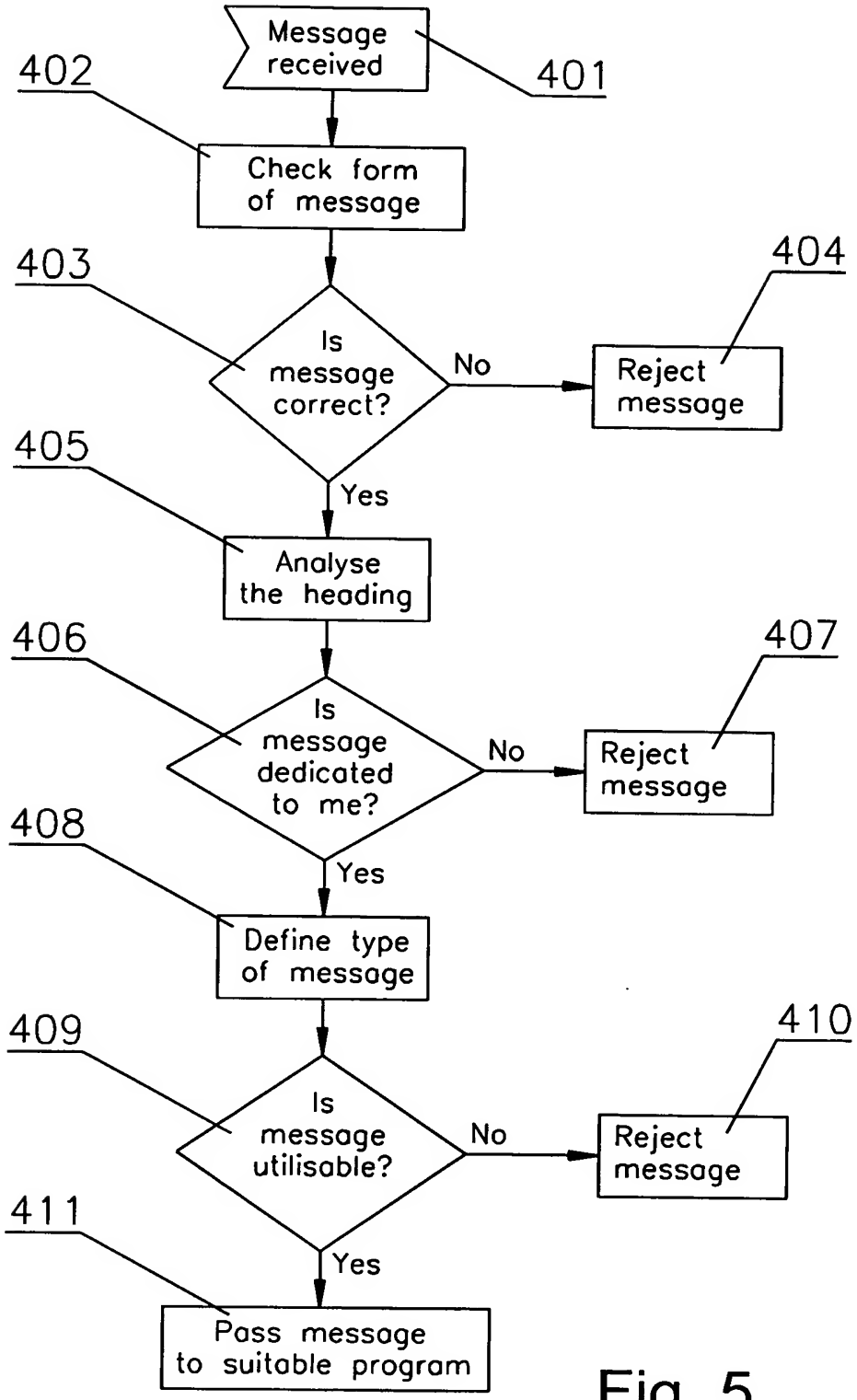

Fig. 5

Repertory No.: 616/6/2004

I, the undersigned, Iwona Duma, sworn translator of the English language for the District Court of the City of Warsaw, hereby certify that the above text is a true and complete translation of the Polish document presented to me.

Warsaw, June 21, 2004.

W WARSZAWIE
TŁUMACZ PRZYSIĘGŁY
MGR IWONA DUMA

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MGR IWONA DUMA
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